

DWR OROVILLE FACILITIES RELICENSING PROJECT (FERC Project No. 2100)

STUDY #1B: LOCAL OPERATIONS MODEL DEVELOPMENT

December 12, 2001

1.0 INTRODUCTION/BACKGROUND

The Statewide Operations modeling defines the gross monthly average operation of Oroville Reservoir. Within the boundaries defined by the Statewide Operations modeling there is an opportunity to operate the Oroville – Thermalito complex to meet very short term, local operation goals, especially power generation. This local operation requires more detailed modeling of the operations of the Oroville – Thermalito complex on a much shorter, probably hourly, timestep than the statewide operation modeling. The statewide operations modeling will set monthly and/or weekly operation limits on total reservoir releases to ensure appropriate water supply operations. The local operations modeling will optimize the detailed operations within the water supply operation and other short-term operation constraints to maximize power generation.

2.0 STUDY GOAL(S) AND OBJECTIVE(S)

The goal of this study is to develop appropriate local operation modeling tools and perform the benchmark simulations to allow detailed evaluations of the Oroville-Thermalito operational alternatives.

3.0 RELATIONSHIP OF THE STUDY PLAN TO RELICENSING PROJECT PROCESS/PURPOSE AND NEED FOR THE STUDY

Relationship of the Study Plan to Relicensing Project Process.

The relicensing process requires analysis of potential impacts from a wide range of operational alternatives. The model developed as a result of this study will be used to produce simulated operational data from these alternatives for use in the required analysis.

Purpose and Need for the Study

The purpose of this study is to produce a tool that can be used to provide the detailed local water and power operations of the Oroville – Thermalito Complex. These detailed operations are required for use in further modeling activity as well as directly in the impact analysis process. Without this tool the analysis based on the simulated operation data from the tool could not be performed.

4.0 SCOPE – STUDY AREA

[illegible]

This study will evaluate potential models and tools that could be used to develop a local operations model of the Oroville – Thermalito Complex. The resulting model will attempt to maximize the power generation within the storage, release, and flow requirements on the system.

*DWR Oroville Facilities Relicensing FERC Project No. 2001
Local Operation Model Development*

Draft – Subject to Revision

generation because of its ability to quickly turn on and off generation to meet peak loads and because it can use less valuable off-peak power to pump water back through the generators to generate more valuable on-peak power as it is needed, (in effect this is storing electrical power with an economic cost).

Because of the difference in value of electrical generation at different times of the day power generation is typically simulated on an hourly timestep. The actual power generation is driven by the economics of operation to meet a given electric demand curve with a given mix of generation and/or power contract options to supply the power to meet the demands. The Oroville-Thermalito complex is operated in conjunction with other SWP power facilities as well as contractual obligations and resources. Further complicating the analysis is the fact that since electrical power generation is driven by both the need to meet the current hours load and the need to reserve capacity to meet loads in future hours. For example you do not want to use all available water for generation in off peak hours and miss the opportunity to use that water for generation during on-peak hours later in the week. Power generation models optimize the power generation over a longer time interval, typically a week, to maximize overall economic value of the power generated.

Detailed Methodology and Analysis Procedures

Task 1 – Identify required products from the model

As currently formulated the required products from this model include:

- Oroville Reservoir Release
- Diversion Pool release to Thermalito Forebay
- Diversion Pool release to low flow section of Feather River
- Pumpback from Diversion pool to Oroville Reservoir
- Pump/Generation at Hyatt Powerhouse
- Release from Thermalito Forebay to Thermalito Afterbay
- Pumpback from Thermalito Afterbay to Thermalito Forebay1
- Pump/Generation at Thermalito Powerhouse
- Diversion from Thermalito Afterbay
- Release from Thermalito Afterbay to the Feather River
- Feather River flow below Thermalito Afterbay return

Task 2 – Identify existing data/models/modeling tools

Existing modeling tools that will be evaluated for use in building this model include:

- DWR's COLOSSUS model
- DWR's CALSIM II model
- PROSYM-WATERWAY
- VISTA

Each of these tools, and possible others, will be evaluated for suitability to meet the needs identified in Task 1.

Task 3 –Develop Local Operation Model

The local operations model will include Oroville reservoir, Hyatt Powerhouse..., A schematic of the local operation model is on Attachment A

- Develop procedure to split monthly results from statewide operation model into hourly data required for local operation model
- Select appropriate modeling tool
- Modify tool as required
- Develop hourly timestep model
- Verify completed model. It will not be possible to calibrate this model in the traditional sense because it simulates a potential condition. There is no historical data that can be compared to the results. The verification will be performed by careful review of the results to ensure that they are reasonable. The results will also be checked to ensure that the sum of the hourly results match up with the monthly Statewide modeling simulation results that were used to generate the hourly input data.

Task 4 – Perform Local Operation Model benchmark simulations

Using the results of the Statewide Operations benchmark simulations perform the local operations modeling to provide the detailed benchmark simulations

6.0 RESULTS AND PRODUCTS/DELIVERABLES

Results

This study plan will result in a local operations simulation model and 2001 and 2020 benchmark studies for use in the process.

Products/Deliverables

There will be two products of this study plan:

1. A local operation model of the Oroville – Thermalito Complex that includes both water operations as well as power operations. This product will be fully integrated into the overall modeling scheme.
2. Simulated local operations for the 2001 and 2020 benchmark studies for use in other analysis.

7.0 STUDY PLAN COORDINATION AND IMPLEMENTATION STRATEGY

Coordination with Other Resource Areas/Studies

Engineering and Operations Study Plans

Study Plan No. 1 - Model Development
Study Plan No. 1a - Statewide Operations Model Development
Study Plan No. 1b - Local Operations Model Development
Study Plan No. 1c - Oroville Reservoir Temperature Model Development
Study Plan No. 1e - Feather River Temperature Model Development
Study Plan No. 2 - Modeling Simulation
Study Plan No. 3 – Hydropower Generation

Study Plan Tracking/Regulatory Compliance Requirements

None

8.0 REFERENCES

ATTACHMENTS

A. Schematic of Local Operations Model

Attachment A.

